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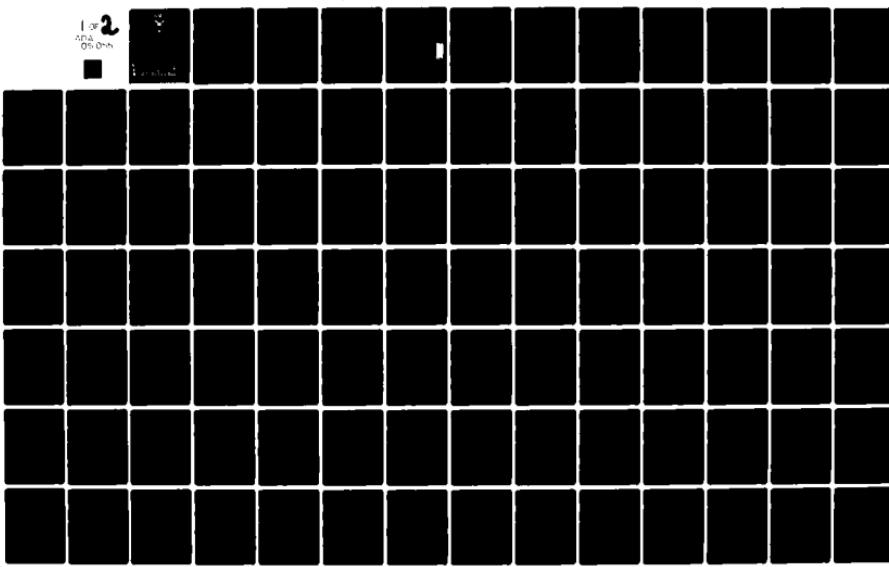
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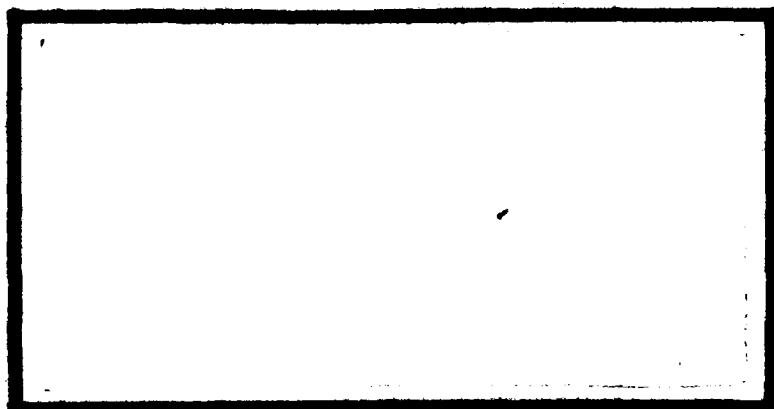
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JOB CHARACTERISTICS VARIABLES, THE
RELATIONSHIP OF JOB VARIABLES TO
JOB SATISFACTION, ORGANIZATIONAL
CLIMATE, AND PERCEIVED PRODUCTIVITY.

LEONARD H. CHALK, 1st Lt, USAF
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The objective of this study was to determine the number of orthogonal factors contained within the Comprehensive Job Inventory, and to determine the effect that these factors have on Job Satisfaction, Organizational Climate, and Perceived Productivity. The survey instrument, and the organizational Assessment Package were administered to 332 subjects at Bolling Air Force Base. Factor analysis to determine underlying factors measured by the instrument, was conducted across all responses. Fourteen factors relating to job characteristics were identified. Individual factor scores were calculated for Job Satisfaction, Organizational Climate, and Perceived Productivity, as well as the fourteen orthogonal factors in the Comprehensive Job Inventory. Regression analysis was performed using the factor scores from the fourteen orthogonal factors in the Comprehensive Job Inventory as the independent variable, and the factor scores for Job Satisfaction, Organizational Climate, and Perceived Productivity each in turn as the dependent variable. Results indicated that a significant amount of the variance in Job Satisfaction, Organizational Climate, and Perceived Productivity can be attributed to the factors in the Comprehensive Job Inventory.

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JOB CHARACTERISTICS VARIABLES, THE
RELATIONSHIP OF JOB VARIABLES TO
JOB SATISFACTION, ORGANIZATIONAL
CLIMATE, AND PERCEIVED PRODUCTIVITY

A Thesis

Presented to the Faculty of the School of Systems and Logistics
of the Air Force Institute of Technology
Air University

In Partial Fulfillment of the Requirements for the
Degree of Master of Science in Logistics Management

By

Leonard H. Chalk, BS
1st Lieutenant, USAF

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WS-12

June 1981

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This thesis, written by

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and

Mr. Farrell D. Nielsen

has been accepted by the undersigned on behalf of the faculty of the School of Systems and Logistics in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE IN LOGISTICS MANAGEMENT

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William H. Hendry
COMMITTEE CHAIRMAN

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Chapter 1

INTRODUCTION

Researchers and managers alike are increasingly attending to the way jobs are designed as an important factor in determining the motivation, satisfaction, and performance of employees at work (Hackman and Lawler, 1971). Numerous scholars have documented a number of unintended and unfortunate consequences of the trend toward work simplification (e.g., Argyris, 1964; Blauner, 1964; Herzberg, Mausner, and Snyderman, 1959). In brief it has been shown that simple, routine nonchallenging jobs often lead to employee dissatisfaction and high turnover (Hackman and Lawler, 1971). The disadvantages of specialization tend to dominate the advantages more often than previously thought. The repetitious job often leads to monotony, boredom, job dissatisfaction, and ultimately poor job performance (Chase and Aquilano, 1973).

Job Characteristics

During the 1940's and 1950's, workers placed "steady work" as the most important thing they wanted from their jobs. By sharp contrast, a 1969 survey listed "interesting work" first, with "job security" coming seventh;

six of the eight top-ranking work aspects related to job content (Strauss, 1974).

Industrial studies have repeatedly found task achievement to be a major source of satisfaction on the job. It has been found that most individuals value jobs which allow them to control their own work pace and work methods, to exercise their skills and abilities, and to learn new things. The opportunity to use one's own judgment, which means to use one's own mind, may be the common element involved here (Locke, 1970).

Comprehensive Job Inventory

Several studies have been performed during the past decade to determine the effect that certain job characteristics have on job satisfaction and productivity. There have been a variety of instruments used to attempt to measure the variables associated with factors such as skill variety, task identity, autonomy, and feedback. Hackman and Oldham developed a "Job Diagnostic Survey" in 1974 to establish the relationship of core job dimensions to criterion such as job satisfaction and motivation (see Figure 1).

The "Comprehensive Job Inventory" used in this study (see Appendix A) is an instrument similar to the "Job Diagnostic Survey" developed by Hackman and Oldham, in that

it measures job characteristic factors, but has been expanded to include additional job factors.

Impact on the Military

The military organization is affected by the same technological, social, and cultural trends that effect civilian industry (Crooch, 1976). Records of the Air Force Manpower and Personnel Center (AFMPC), Randolph Air Force Base, Texas, show that reenlistment rates for second term and career airmen in many aircraft maintenance specialties have declined each year since 1977 (Hall and Nelson, 1980). While it is possible that other external factors such as pay and promotion have bearing on this decline, such retention factors as employee alienation and job dissatisfaction cannot be overlooked. Reduced manpower, increased labor cost, and expanded mission responsibilities magnify the need for new management techniques that increase individual levels of performance and satisfaction, while reducing employee alienation (Crooch, 1976).

LITERATURE REVIEW

The practice of management during the late nineteenth, and early twentieth centuries was at best a very haphazard, and segmented function. With the advent of the industrial revolution, and the change from craftsmen working individually, to the assembly line operations of mass

production, the importance of managing and controlling people in the work place was becoming more evident.

Frederick W. Taylor is credited with the formulation of the "Scientific Management" movement, although the original concept was first developed by Henry R. Towne in 1870 (George, 1968). Taylor sought to reduce every work operation down to the smallest increment of movements to obtain the sequence necessary to form a production line type of operation (Drucker, 1970).

Herzberg's Motivator-Hygiene Model

One of the most influential theories of job enrichment has been the motivator-hygiene theory introduced by Frederick Herzberg in 1959 (Herzberg, Mausner, and Snyderman, 1959). The theory classifies the determinants of employee satisfaction as motivators and the determinants of employee dissatisfaction as hygienes.

Hygiene factors are not related to the content of work but rather to the context and surrounding environment of the job. Hygiene factors consist of company policy, administrative practices, supervision, interpersonal relationships, salary, and security, etc. By optimizing these factors the workers will not feel satisfied. Dissatisfaction is a function of the environment while satisfaction is a function of the content of work.

Motivators are related to the content of work and are therefore the primary determinants of employee satisfaction. Motivators include achievement, recognition for achievement, interesting work, growth, and advancement, etc. Attention to hygiene factors in the organization will make work more tolerable but will not contribute to increased worker motivation or to productivity. Increased motivation and productivity depends upon increasing the motivators in the job (Herzberg, 1966).

Although the motivator-hygiene theory has not been completely validated from an empirical standpoint, "it has been successfully used as a conceptual basis for numerous job enrichment efforts" (Umstot, 1975).

Paul, Robertson, and Herzberg (1969) used the motivator-hygiene model in their job enrichment experiments at Imperial Chemical Industries in Great Britain. The experiments were conducted over a two year period and provided support for the contention that job enrichment results in increased satisfaction and, in some cases, increased productivity.

While Herzberg theory is popular with managers, and has been successfully employed as a basis for numerous job enrichment efforts, there is still some question as to its appropriateness. House and Wigdor (1967), in a review of 31 studies, found that those factors which satisfy one individual may cause dissatisfaction in another.

Protestant Work Ethic

Blood and Hulin (1967) found a near zero relationship between skill level and job satisfaction for blue collar workers from highly urban areas, but a positive relationship between skill level and job satisfaction was found for workers that were from areas that were less urbanized. These findings were based on data that were analyzed from 1300 blue-collar workers. Blood and Hulin argued that workers from large cities could be considered to be alienated from work norms of the middle class, and the work related aspects of the Protestant ethic. Large city workers were probably more integrated with the norms of their own particular subculture. They concluded that job enrichment efforts as a means of increasing job satisfaction will only be effective when applied to certain segments of the work force (mainly nonalienated blue-collar workers, and white-collar workers) (Hulin and Blood, 1968).

Stone and Porter (1973) used the Requisite Task Attribute Index (RTA Index) to measure the relationship between job characteristics and job satisfaction. They used a sample of 556 employees in a western telephone company. The employees worked and lived in urban areas. Stone and Porter's sample of urban employees, who worked on jobs that were complex, did not experience dissatisfaction with work. Stone and Porter's results showed that indices of job

characteristics were positively and significantly related to satisfaction with work itself.

Job Diagnostic Survey

Hackman and Lawler (1971) performed research involving employee reactions to job characteristics. They used four job core dimensions (variety, autonomy, task identity and feedback). They hypothesized and found that when jobs are high on the four core dimensions, employees who are desirous of higher order need satisfaction tend to have higher motivation, higher job satisfaction, and be rated by supervisors as doing high quality work.

Brief and Aldag (1975) performed a constructive replication of the Hackman and Lawler (1971) investigation. They found a positive correlation between job characteristics and worker responses in individuals with high growth need strength. Their findings provided additional support for and served to extend the applicability of the Hackman and Lawler study.

Hackman and Oldham (1975) provided the tools necessary to accurately diagnose existing jobs by providing a blueprint for job design efforts (Fig. 1). They present five measurable characteristics of a job called "core job dimensions" which when combined into a single equation, yield the motivating potential score (MPS). The complete equation is as follows (Hackman and Oldham, 1974):

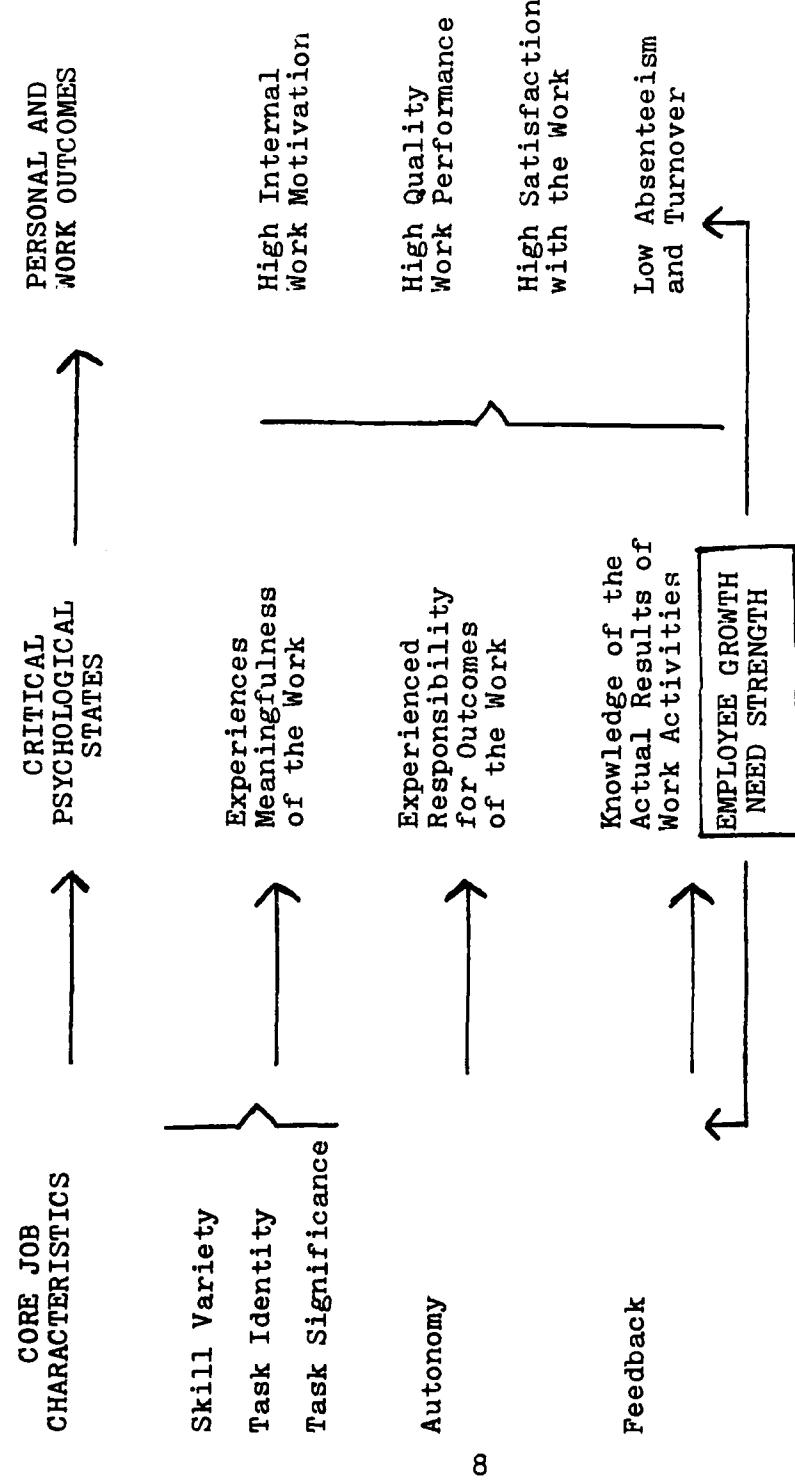


Figure 1. The Relationships Among the Core Job Dimensions, the Critical Psychological States, and On-the-Job Outcomes (Hackman, Oldham, Jansen and Purdy, 1975).

$$MPS = \frac{\text{Skill Variety} + \text{Task Identity} + \text{Task Significance}}{3}$$

X (Autonomy) X (Feedback)

The dimensions in the model are defined as follows:

1. Skill Variety--the degree to which a job requires a variety of different activities in carrying out the work, which involve the use of a number of different skills and talents of the employee.
2. Task Identity--the degree to which the job requires completion of a whole and identifiable piece of work, doing a job from beginning to end with a visible outcome.
3. Task Significance--the degree to which the job has an impact on the lives or work of other people.
4. Autonomy--the degree to which the job provides freedom, independence, and discretion to the employee in scheduling the work and determining the procedures to be used in carrying it out.
5. Feedback--the degree to which carrying out the work activities required by the job result in the employee obtaining direct and clear information about the effectiveness of his or her performance.

As can be seen in Fig. 1, the relationship of the five elements are multiplicative, and any increase in one of the dimensions will increase the overall "Motivating

Potential Score" (MPS) however, a low value on either of the three major dimensions will result in the lowering of the MPS.

The JDS model, as advanced by Hackman and Oldham, provided also what they termed the "Critical Psychological States"; experienced responsibility for the outcomes of work, experienced meaningfulness of the work, and knowledge of the actual results of the work activities, as mediating between the basic core dimensions and the work outcomes. The total value obtained is moderated by what the authors term "Employee Growth Need Strength".

Hackman and Oldham validated their model using a survey of 658 employees working in 62 different jobs in seven organizations. The jobs were highly heterogeneous, including blue-collar workers, white-collar, and professional employees. The JDS was used to measure each of the variables in the Job Characteristics Model, (skill variety, task identity, task significance, autonomy, and feedback). Using these five core dimensions, it was theorized that they were responsible for creating one of the three critical psychological states (experienced meaningfulness of work, experienced responsibility for outcomes of work, and knowledge of the actual results of the work activities).

Using partial correlation and multiple regression analysis, Hackman and Oldham demonstrated the model was usable and that a Motivational Potential Score could be

predicted with the JDS. The moderating effect of employee growth needs strength on the basic dimensions and the resulting job satisfaction was also demonstrated.

Sims, Szilagyi, and Keller (1976) tested an improved job characteristic model in an attempt to provide a valid instrument that could be utilized for many different types of organizational settings. In their instrument (Job Characteristics Inventory) JCI, they measured six job characteristics dimensions that were felt to be representative of a wide spectrum of organizational settings. Using the six factors (variety, autonomy, feedback, dealing with others, task identity, and friendship) their research was first tested in a medical facility, with questionnaires collected from a sample of 1161 employees.

The resulting data were analyzed with the Statistical Package for the Social Sciences program (SPSS), using factor analysis. Four of the predictors, variety, autonomy, feedback and friendship were shown to have congruency coefficients in the high 80's and 90's. Two of the factors, task identity and dealing with others, showed some relationship across all of the predictors.

In order to check the stability of the Job Characteristic Inventory, data were collected from a southwestern manufacturing firm. Questionnaires were sent to 300 of the firms managerial and supervisory personnel. They received 192 of the questionnaires back for a response rate of 64%.

The data were analyzed in the same manner as had been done in the medical center tests, with the exception that 14 new items had been added to the scale since the medical center tests, to improve the reliability and discrimination of the characteristic scale. As had been the case in the medical center tests, congruency coefficients were found to be in the high 80's and 90's for the six job characteristic dimensions. These findings provided further proof of the validity of the Job Characteristic Inventory Model for use in various different organizational environments. The researchers pointed out that, although six elements used in the experiments showed congruency coefficients in the high 80's and 90's, there still could be other factors that have not been measured such as, task complexity, responsibility, and challenge that could be introduced by further research in this area.

Brief and Aldag (1978) conducted a study of the six perceived job characteristics in the JCI, previously done by Sims et al.

From a universe of 3400 nurses, 210 were randomly selected, and questionnaires sent to them. They received 155 responses for a return rate of 76%. The data were analyzed using factor analysis, with varimax rotation. The correlation between friendship and dealing with others (.51) and the correlation between autonomy and task

identity (.60) led Brief and Aldag to question the validity of the subscales.

In summary of their research, the authors felt there was little support for the discriminant validity of the JCI, as advanced by Sims et al.

The validity of the Job Characteristics Inventory versus the Job Diagnostic Survey was tested (Pierce and Dunham, 1978) using data collected from a sample of 155 employees of an insurance company. The sample included approximately 50% male and 50% female employees, drawn from three separate job classifications (claims, clerical, and underwriting). The four core elements that are included in both the JDS and the JCI were the main focus of the study (feedback, variety, identity, and autonomy). The results showed that the estimates using the format of the Job Characteristic Inventory was higher in every case than when using the Job Diagnostic Survey.

Using oblique rotation, a clean definition of the four a priori scales of the JDS could not be produced. The identity factor was the only one that matched the a priori definition, it matched on three of the identity items. Feedback was matched on only two of the a priori definitions, as was the autonomy factor. The variety factor loaded on both factors two and three (see Table 1).

The four factor oblique rotation of the Job Characteristics Inventory results produced a clean definition of

TABLE 1

JDS FOUR-FACTOR SOLUTION

Items	Factor			
	I	II	III	IV
Variety				
1	.10	.16	.56	.21
2	.13	.49	.16	.00
3	.12	.10	.63	.05
Autonomy				
1	.24	.56	.11	.06
2	.23	.26	.22	.10
3	.04	.62	.14	.13
Feedback				
1	.14	.05	.10	.62
2	.19	.14	.05	.61
3	.06	.11	.08	.25
Identity				
1	.63	.10	.17	.13
2	.60	.17	.16	.18
3	.63	.13	.01	.03
Eigenvalue	4.0484	.69135	.57543	.29276

Factor Correlation Matrix a.

Factors	I	II	III	IV
I	-			
II	.31	-		
III	.39	.42	-	
IV	.24	.29	.19	-

a Decimals have been omitted

the four a priori JCI scales, suggesting a four factor solution as being appropriate (see Table 2).

Pierce and Dunham (1978) concluded the consistency of the JCI was stronger than the JDS for parallel job characteristics that both of them measured. The factor analysis of the JDS results versus those of the JCI suggest there is somewhat better discrimination in utilizing the JCI over the JDS.

Since the elements of the JDS appeared prior to the ones associated with the JCI, it is possible that part of the superiority of the JCI may be due in part to the respondent becoming sensitized into thinking about the core dimensions of their jobs, and therefore providing a cleaner discrimination in their response to the JCI elements. Although this study clearly shows the superiority of the JCI over the JDS, the utility of the JDS in design research was clearly demonstrated (Pierce and Dunham, 1976).

Arnold and House (1980) performed research involving three issues of the job characteristics model of motivation (Hackman and Oldham, 1976). Although the model outlined by Hackman and Oldham has been of considerable interest in research, Arnold and House raised several questions over the methodological, analytical and substantive validity of the model.

The model was modified to correct the criticisms raised by Salanick and Pfeffer (1977). Since the JDS

TABLE 2

JCI FOUR-FACTOR SOLUTION

Items	Factor			
	I	II	III	IV
Variety				
1	.77	.13	.05	.12
2	.72	.05	.07	.13
3	.82	.04	.01	.08
4	.67	.17	.17	.01
5	.80	.20	.00	.03
Autonomy				
1	.10	.11	.64	.02
2	.16	.23	.46	.01
3	.00	.14	.75	.06
4	.30	.12	.63	.13
5	.19	.06	.70	.14
Feedback				
1	.14	.02	.05	.82
2	.20	.01	.08	.83
3	.17	.01	.07	.71
Identity				
1	.12	.77	.06	.02
2	.03	.72	.01	.16
3	.19	.77	.07	.08
4	.07	.69	.13	.14
Eigenvalue	6.6526	1.6933	1.3878	1.2859
Factor Correlation Matrix a.				
Factor	I	II	III	IV
I	-			
II	28	-		
III	24	21	-	
IV	17	17	20	-

a Decimals have been omitted

measured the employees perceived job characteristics and then job attitude, Salanick and Pfeffer felt they were in effect modifying the underlying attitude on the job characteristic by asking the employee about their job attitude first. They felt as a result of being "primed" to respond in this manner, the correlations between job attitude and job characteristics were not the result of the job characteristic causing the job attitudes. Arnold and House also questioned the validity of the Hackman and Oldham (1976) method of computation of their "Motivational Potential Score" by the three-way interaction of the psychological states in determining work motivation. The validity of the "Growth Needs Strength" factor as a moderator was their final point of contention with the Job Diagnostic Survey.

In testing their modified version of the JDS model, Arnold and House collected data from a sample of 120 exempt personnel employed by a midwestern manufacturing organization. From their analysis of the data collected, they could not support formulation of the Motivational Potential Score, as had been advanced by Hackman and Oldham in the earlier model. They also failed to find any support for the hypothesized three-way interaction of the psychological states that Hackman and Oldham had argued were necessary for the internal work motivation factor.

The results of their study did indicate that the psychological states and job characteristics are related to

various work outcomes, but they could not define exactly what this relationship was.

Walsh and Beehr (1980) introduced an "Integrated Model of Perceived Job Characteristics" in an attempt to identify a group of perceived characteristics that could be related to psychological meaning for the employee, and show some relationship identifiable to job satisfaction. Although they accepted the idea that; autonomy, variety, task identity, task significance, and feedback were the normally accepted factors most widely recognized as mediating job satisfaction and perceived job characteristics, they felt that the relationship of the intervening psychological states needed to be defined more clearly. The psychological states used by Walsh and Beehr were, role clarity and challenge. In turn they divided the perceived job characteristics into two components, an information and an action component.

A 10% random sample from a manufacturing firm was selected to complete the study. There was a total of 958 people sampled, ranging from fabrication and assembly of motors, to the upper levels of plant management.

In analysis of their study, utilizing successive iterations of path analysis technique, a substantial amount of the variance in job satisfaction was explained by the action and information components, and the intervening psychological states of role clarity and challenge.

Valenzi and Dessler (1978) performed research on the effects of three variables; role ambiguity, leader consideration, and leader initiating structure, on subordinate job satisfaction. Using correlational analysis and analysis of variance it was concluded that leader consideration and subordinate role ambiguity, singly and jointly, are associated with subordinate job satisfaction. They found that role ambiguity was negatively related to subordinate satisfaction, and leader consideration was positively related to subordinate satisfaction.

The indication from prior research is that some correlation exists between certain job characteristics and job satisfaction, organizational climate, and perceived productivity.

Problem Statement

A solid body of knowledge about the consequences of job enrichment has not emerged from behavioral science research. Neither are there abundant data available about the relative effectiveness of various strategies for implementing work redesign projects (Hulin and Blood, 1968; Porter, Lawler, and Hackman, 1975, chap. 10). Research has been performed to relate job satisfaction to certain job core dimensions (variety, autonomy, task identity, feedback) (Hackman and Lawler, 1971; Hackman and Oldham, 1975). However, it is still not known, what are significant

factors contained within the "Comprehensive Job Inventory," and what is the relationship between these factors and job satisfaction, organizational climate, and perceived productivity.

Objectives

There are two objectives of the proposed research: first to identify the variables that make up job characteristics within the Comprehensive Job Inventory; second to establish the relationship between those variables and job satisfaction, organizational climate, and perceived productivity.

Research Hypotheses

The following research hypothesis will be tested to accomplish the first objective:

H_1 : There are ten or more orthogonal job related factors within the Comprehensive Job Inventory.

The following research hypotheses will be tested to accomplish the second objective:

H_2 : Forty percent or more of the variance in job satisfaction can be explained by the factors in the Comprehensive Job Inventory.

H_3 : Forty percent or more of the variance in organizational climate can be explained by the factors in the Comprehensive Job Inventory.

H₄: Forty percent or more of the variance in perceived productivity can be explained by the factors in the Comprehensive Job Inventory.

CHAPTER II

METHODOLOGY

Research Design

The design used in this research was a causal study (Emory, 1976). The survey instrument was an attitudinal survey which was administered by the Leadership and Management Development Center (LMDC). The subjects used in this research were 332 members of organizations from Bolling Air Force Base Maryland. The selection of these subjects would have to be termed a convenience sample, rather than a random sample. The administration of the survey instrument was conducted by personnel of LMDS between December, 1980, and March, 1981.

The Measurement Instrument

The same measurement instrument was used for each observation. The instrument consisted of The Organizational Assessment Package (Appendix A), and a 50 question supplemental questionnaire (Appendix B), which included all of the questions that were originally contained in the Comprehensive Job Inventory (Appendix C). The Comprehensive Job Inventory contained 110 questions, 5 of which deal with categorical data about the respondent, items 6 through 82

consist of the comprehensive job inventory items, questions 83 through 92 were intended to measure job satisfaction, questions 93 through 102 were intended to give information about the organizational climate, questions 103 through 110 were intended to measure perceived productivity.

All questions, except the first five background questions, were measured on a 7-point Likert scale. Much of the literature assumes the Likert scale to be ordinal in nature (Emory, 1976), and therefore not conducive to the use of parametrics. There is additional thought on the subject however, which supports the use of summated scales with parametric procedures (Gardner, 1975). The distinction between ordinal and interval scales is not sharp. Many summated scales yield scores that, although not strictly of interval strength, are only mildly distorted versions of an interval scale. Some of the arguments underlying the assertion that parametric procedures require interval strength statistics appear to be of doubtful validity. Parametric procedures are, in any case, robust and yield conclusions even when mildly distorted data are fed into them. Furthermore, if the distortions are severe, various transformations techniques can be applied to the data (Gardner, 1975).

This research assumed the Likert scales to be "mildly distorted" data, thereby allowing the application of parametric statistical techniques.

Statistical Procedure

The primary objective of this research was to identify the factors contained within the comprehensive "Job Characteristics Inventory", and their relationship to perceived productivity, job satisfaction, and organizational climate.

Analysis of the data collected by the Leadership Management Development Center (LMDC) was done utilizing the Statistical Package for the Social Sciences (Nie, 1975). The analysis was accomplished using principal factoring with iteration, selecting a minimum eigenvalue equal to or greater than one. The eigenvalue indicates the amount of total variance in the data accounted for by the factor. It is the sum of the squares of all loadings on each factor. It is generally considered that values of less than one are not meaningful, because the total variance explained would be less than the variance explained by the original variable (Nie, 1975). The loading of a variable is the extent to which that variable measures a given factor (Kerlinger, 1973).

There are three basic steps involved in factor analysis, the establishment of a correlation matrix, selection of the initial factors, and rotation of the factors to establish maximum solution results.

When a factor matrix is analyzed using factor analysis there are two basic types of analysis that can be performed, Q-factor, the analysis of matrix units of groups or units, and R-factor, the analysis of pairs of scale items (Emory, 1976). The correlations analyzed in this study involved the R-factor, the study of scale items.

The establishment of a simplified correlation matrix, the first step in factor analysis, is shown in Table 3. The amount of correlation between the individual variables is shown at the intersection of the columns and rows of each variable. Maximum correlation would be 1.00, and where none or little correlation existed the value would be close to zero. As can be seen in the table, there appears to be two clusters or groups of factors. There is correlation between factors 1, 3, and 5, and also correlation between 2, 4, and 6, but minimum correlation between the two clusters. From analysis of the values in the table, it can be seen there are two factors that can be clearly identified.

After the factors have been identified, the next step is rotation of the factors to establish the maximum solution. Rotation can be done in either of two methods, oblique or orthogonal. In oblique rotation the factors are rotated individually, until the factors fit the distinct clusters, regardless of the correlation between the clusters. In orthogonal rotation, the factors are rotated as a

TABLE 3

CORRELATION MATRIX

		Question					
		1	2	3	4	5	6
Question	1	1.00	.05	.77	.19	.85	.17
	2	.05	1.00	.13	.77	.21	.92
	3	.77	.13	1.00	.04	.84	.04
	4	.19	.77	.04	1.00	.00	.93
	5	.85	.21	.84	.00	1.00	.11
	6	.17	.92	.04	.93	.11	1.00

group about the origin, until the best fit is established, while still maintaining the same relationship between the factors (Rummel, 1967). In order to define factors that are elements of the Job Characteristics Inventory, orthogonal rotation was used in this study.

Once the factors had been identified, they were regressed against the three components of the problem statement, job satisfaction, perceived productivity, and organizational climate. This was accomplished using the Statistical Package for the Social Sciences (Nie, 1978), and the relationship between the factors and components of the problem statement should establish a workable hypothesis that can be utilized by management to better structure jobs in the future.

CHAPTER III

RESULTS

Factor Analysis

The factor analysis was conducted, first utilizing the Comprehensive Job Inventory (see Appendix C) combined with the Job Inventory section of the Organizational Assessment Package (OAP) (see Appendix A). Any of the questions not contained within the OAP, were listed on the supplemental questionnaire (see Appendix B). This combination was treated as one survey instrument representing the job inventory.

Twenty-four factors were observed with eigenvalues equal to or greater than 1.0. It was observed, however, that the factors with eigenvalues at or near the 1.0 level accounted each for only 1.1 to 1.4 % of the total variance. Also two or more variables were not loading on these factors at a level of .50 or better, which was the criteria established for naming each factor. Therefore, the number of factors was decreased one by one, until all factors had at least two variables loading at the .50 level or better. This resulted in fourteen factors being retained for analysis. These factors are shown in Appendix D, along with their highest loading items, which were used to name the

factors. All fourteen factors demonstrated an alpha coefficient of .65 or better, and the fourteen factors accounted for 57.7% of the total variance measured by the comprehensive job inventory. This demonstrated that the first null hypothesis could not be rejected.

Factor Characteristics

The fourteen factors that were retained, along with the individual percent of variance that each factor accounted for and the characteristics applicable to each factor were as follows:

FACTOR I Job Enrichment

This factor accounted for 15.1% of the variance, and had a coefficient alpha of .94. It referred to the extent that the task being accomplished by the employee was of major importance within the overall job situation of the worker. Job Enrichment encompassed such job related factors as the responsibility of the employee to be accountable for the completion of a larger more meaningful portion of a task, rather than a small segmented, short interval job.

FACTOR II Task Significance

This factor accounted for 10.5% of the variance, and had a coefficient alpha of .72. It referred to the extent which the employee felt the task he was assigned was meaningful and of an important nature. In some type of

tasks, such as automobile assembly lines, where employees do only a small or incremental portion of the overall job, the amount of significance associated with the job will be small and insignificant to the employee. Task significance encompassed such related factors as, the effect the given task had on other employees within the work group, and the variety of skill or talents that are required to complete the job.

FACTOR III Task Autonomy

This factor accounted for 4.3% of the variance, and had a coefficient alpha of .85. It referred to the degree of independence or freedom the employee felt he had on the accomplishment of his job. It involved the ability of the employee to complete tasks at his own rate of speed or pace of work, rather than to have his work output paced by a mechanical assembly line type of operation where he is forced to work at the pace set by management. This factor also included the ability of the employee to vary the time spent in his work place, and his ability to move about the production area, as opposed to being required to stay in one set area to accomplish his job.

FACTOR IV Time Management

This factor accounted for 4.0% of the variance, and had a coefficient alpha of .81. It referred to the extent to which the employee had some degree of difficulty in

completing his daily tasks in an orderly, clear fashion. It involved elements such as the amount of input he had in setting the priorities for his work schedule, and how much he must rearrange his work during the day to meet any changes that may come up. It included to some extent the difficulty he had in completing the work requirements for his normal work day.

FACTOR V Need of Achievement/Job Desires

This factor accounted for 3.3% of the variance, and had a coefficient alpha of .89. It referred to the extent the drive or needs of the employee for a feeling of some degree of fulfillment or self-actualization was gained from the job. It encompassed such elements as the extent to which the employee was doing a job that he felt was meaningful, and that the skills he possessed were being made use of and were not wasted on a job of little value. The job desires of the employee also included the opportunity of the worker to have a degree of independence in the completion of their work.

FACTOR VI Planning

This factor accounted for 3.1% of the variance, and had a coefficient alpha of .74. This factor, although conceptually similar to factor IV Time Management, referred to the extent to which the employee becomes involved with the production planning and scheduling of work requirements.

This planning could vary from the requirement for only one day's work, to planning for future work requirements for the next production period, or planning requirements for production as much as six months or a year in the future.

FACTOR VII Work Climate Values

This factor accounted for 2.8% of the variance, and had a coefficient alpha of .89. It referred to the extent to which the employees job presented him with a work relationship climate that was acceptable to his own set of value standards and criteria. It involved such elements as the moral acceptability of the job and the surrounding attributes inherent with the type of work being done. It included the communication and decision making process that operate within his work environment or, and his immediate work site, as well as the characteristics of the job or task.

FACTOR VIII Recognition/Advancement

This factor accounted for 2.7% of the variance, and had a coefficient alpha of .75. It referred to the extent to which an employee was being prepared by his employer to accept position of greater responsibility and authority in some timely fashion or some type of progression system. It included such elements as the opportunity to learn and use new skills and talents that expand the horizon of his

present position and provided him the opportunity to grow and advance to a more responsible position.

FACTOR IX Work Support

This factor accounted for 2.4% of the variance, and had a coefficient alpha of .67. It referred to the extent to which the employee felt management supports and aids him in assuring that problems in his every day task requirements were resolved quickly and effectively. It encompassed such elements as the availability and condition of the equipment he was expected to work with; the response he obtained to having problems with his equipment repaired, and the adequacy of his tools and material necessary in the performance of everyday tasks.

FACTOR X Equipment Goal Clarity

This factor accounted for 2.1% of the variance, and had a coefficient alpha of .78. It referred to the extent to which the employee was provided with adequate tools, equipment and supplies in his immediate work area to complete his job. It was a reflection to some extent, on the prior planning by both management and the employee for the completion of the required work tasks.

FACTOR XI Work Interferences

This factor accounted for 2.0% of the variance, and had a coefficient alpha of .71. It referred to the extent

to which other duties or assignments interfere with the completion of the employees normal assignment. It included such elements as being assigned to committees, requests to aid in areas other than the normal job assignment, and being given additional duty assignments that were not within the employees normal, everyday assignment. It measured the degree to which those outside assignments disrupt or impact on the job satisfaction of an employee.

FACTOR XII Task Repitition/Frequency

This factor accounted for 1.8% of the variance, and had a coefficient alpha of .70. It referred to the extent to which the employee gained satisfaction from a job that had some degree of depth associated with it. It included such elements as the length of the tasks associated with the completion of the job, the frequency or repetition rate of the tasks that are the basis of the job. It covered the general amount of monotony or degree of boredom that the employee associated with his job.

FACTOR XIII Work Group Performance

This factor accounted for 1.8% of the variance, and had a coefficient alpha of .88. It referred to the relative degree to which the employee perceived his immediate work group accomplished their jobs and how effective they were in doing it. It included such elements as the groups ability to solve problems under adverse conditions, the

overall performance measure of the work group, and the ability of the work group to be a cohesive performance unit.

FACTOR XIV Desired Repetitive Tasks

This factor accounted for 1.6% of the variance, and had a coefficient alpha of .66. It measured the extent to which the employee desired (for one reason or another) a task that was short in duration, and the scope of it was relatively easy to accomplish. It included such elements as assembly line type of work present in most mass production operations, where the involvement of the employee with the job was minimal.

Regression Analysis

To test the second, third and fourth hypothesis, the sections of the organizational assessment package dealing with organizational climate, job satisfaction, and perceived productivity were each factored separately. A factor score was computed for each of these three areas for each of the 332 subjects. Factor scores were also computed for the fourteen factors extracted from the job inventory for each of the 332 subjects. Stepwise regression analysis was then performed, using the factor scores for organizational climate, job satisfaction, and perceived productivity each in turn as the dependent variable with the fourteen

factors from the job inventory as the independent factor variables. The factor that explained the greatest amount of variance in the dependent variable entered first; the factor that explained the greatest amount of variance in conjunction with the first entered second, and so on.

Results indicated that 93.7% of the variance in job satisfaction was explained by the factors in the comprehensive job inventory (see Table 4). It must be pointed out, however, that over 76% of the variance (R^2) was attributed to the first factor to enter the equation which was task autonomy, (factor 3). After the next two factors entered the regression, which were factor 14 (desired repetitive tasks), and factor 5 (need of achievement/job desires) over 92% of the variance in job satisfaction was explained. This indicated that after these three factors were considered, only 8% of the variance in job satisfaction remained unexplained. The second null hypothesis, of course, could not be rejected here, but this cast doubt on the significance of the other factors in relation to job satisfaction. Turning to the F-significance test, using an alpha of 0.05, it was noticed that the next four factors to enter the regression (factor 2, factor 7, factor 11, and factor 6), were clearly within significance limits even though together they account for 1.4% of the change in R^2 after the first three factors are considered. Factor 1 at the eighth

step had marginal significance, and the remaining factors were clearly outside significance limits.

An analysis of organizational climate revealed that 83.7% of the variance in organizational climate was explained by the factors in the comprehensive job inventory. The same pattern of dominance by a few of the factors was noticed here, although not as drastic as in the job satisfaction analysis. An examination of Table 5 will illustrate that the first five factors to enter the regression account for 81% of the variance in organizational climate. Those factors are factor eight (recognition/advancement), factor five (job desires), factor two (task significance), factor nine (work support), and factor thirteen (work group performance). The F significance test indicated that the first ten factors clearly were well within significance limits, even though factors at steps six through ten accounted for a combined total of only 1.5% of the change in R^2 . The third null hypothesis obviously could not be rejected.

Analysis of perceived productivity revealed that 83.3% of the variance in perceived productivity was attributed to the factors in the comprehensive job inventory (see Table 6). The first four factors to enter the regression factor two (task significance), factor five (need of achievement/job desires), factor eight (recognition/advancement), and factor nine (work support) accounted for

80.8% of the variance. The fourth null hypothesis could not be rejected. An analysis of the F significance indicated that the factors in the first 9 steps are well within significance limits, although the factors in steps five through nine accounted for only 1.5% of the change in R^2 .

SUMMARY AND RECOMMENDATIONS

This study identified fourteen factors and 57 variables which appeared to be significant within the comprehensive job inventory. The effect of those factors on the variance in job satisfaction, organizational climate, and perceived productivity was considerable, however all of the factors did not contribute equally to the variance. Factors two (task significance), five (need for achievement/job desires), eight (recognition/advancement), and nine (work support), while the order of importance changed, were the dominant factors affecting variance in organizational climate, and perceived productivity. Factors three (task autonomy), fourteen (desired repetitive tasks), and five (need of achievement/job desires) had the major influence on job satisfaction. While the remaining eight factors consistently accounted for less than 1% of the change in R^2 , six of the eight factors demonstrated significance with the F test on at least one of the three dependent variables. Only factors four, and twelve demonstrated a lack of significance at the .05 alpha level on all three dependent variables.

Future studies should be conducted to give additional credence to these factors and their affect on job satisfaction, organizational climate, and perceived productivity.

This research has resulted in a more comprehensive job survey which can be used by the Leadership and Management Development Center to more effectively assess organizational effectiveness of organizations through out the Air Force. In addition, it can be adapted by other organizations to tailor make job surveys for assessing their organizations effectiveness. The flexibility and comprehensiveness of this instrument provides an objective method for measuring job components related to satisfaction, organizational climate, and perceived productivity. In turn, once areas of weakness are established then actions can be taken to reduce or eliminate these probelm areas. This instrument therefore provides a sound objective method for increasing organizational effectiveness through out the Air Force.

APPENDIX A
ORGANIZATIONAL ASSESSMENT PACKAGE

ORGANIZATIONAL ASSESSMENT PACKAGE OUTPUT

The Organizational Assessment Package (OAP) was developed for use by the Air Force Leadership and Management Development Center (LMDC), Maxwell AFB, Alabama. The LMDC mission includes (a) providing management consultation services to Air Force commanders, (b) providing leadership and management training to Air Force personnel in their work environment, and (c) performing research in support of (a) and (b). The consultative role involves organizational problem area identification and recommendations for resolving problems identified.

The OAP was designed to support the mission objectives of LMDC. First, the OAP provides a means of identifying existing strengths and weaknesses within organizational work groups and aggregated work groups, such as directorates. Second, research results can be fed back into Professional Military Education curricula; other leadership and management training courses; and when action is required, to Air Staff and functional offices of primary responsibility. Third, the OAP data base established can be used for research to strengthen the overall Air Force organizational effectiveness program.

1. Total years in the Air Force:

1. Less than 1 year.
2. More than 1 year, less than 2 years.
3. More than 2 years, less than 3 years.
4. More than 3 years, less than 4 years.
5. More than 4 years, less than 8 years.
6. More than 8 years.

2. Total months in present career field:

1. Less than 1 month.
2. More than 1 month, less than 6 months.
3. More than 6 months, less than 12 months.
4. More than 12 months, less than 18 months.
5. More than 18 months, less than 24 months.
6. More than 24 months, less than 36 months.
7. More than 36 months.

3. Total months at this station:

1. Less than 1 month.
2. More than 1 month, less than 6 months.
3. More than 6 months, less than 12 months.
4. More than 12 months, less than 18 months.
5. More than 18 months, less than 24 months.
6. More than 24 months, less than 36 months.
7. More than 36 months.

4. Total months in present position:

1. Less than 1 month.
2. More than 1 month, less than 6 months.
3. More than 6 months, less than 12 months.
4. More than 12 months, less than 18 months.
5. More than 18 months, less than 24 months.
6. More than 24 months, less than 36 months.
7. More than 36 months.

5. Your Ethnic Group is:

1. American Indian or Alaskan Native.
2. Asian or Pacific Islander.
3. Black, not of Hispanic Origin.
4. Hispanic.
5. White, not of Hispanic Origin.
6. Other.

6. Your highest education level obtained is:

1. Non-high school graduate.
2. High school graduate or GED.
3. Less than 2 years college.
4. Two years or more college.
5. Bachelors Degree.
6. Masters Degree.
7. Doctoral Degree.

7. Highest level of professional military education (residence of correspondence):

0. None or not applicable.
1. NCO Orientation Course or USAF Supervisor Course (NCO Phase 1 or 2).
2. NCO Leadership School (NCO Phase 3).
3. NCO Academy (NCO Phase 4).
4. Senior NCO Academy (NCO Phase 5).
5. Squadron Officer School.
6. Intermediate Service School (i.e., AFSC, AFSC).
7. Senior Service School (i.e., AWC, ICAF, NWC).

8. How many people do you directly supervise?

1. None	5. 4 to 5
2. 1	6. 6 to 8
3. 2	7. 9 or more
4. 3	

9. For how many people do you write performance reports?

1. None	5. 4 to 5
2. 1	6. 6 to 8
3. 2	7. 9 or more
4. 3	

10. Does your supervisor actually write your performance reports?

1. Yes	2. No	3. Not Sure
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11. Which of the following "best" describes your marital status?

0. Not married.
1. Married: Spouse is a civilian employed outside home.
2. Married: Spouse is a civilian employed outside the home - geographically separated.
3. Married: Spouse not employed outside home.
4. Married: Spouse not employed outside home - geographically separated.
5. Married: Spouse is a military member.
6. Married: Spouse is a military member - geographically separated.
7. Single parent.

12. What is your usual work schedule?

1. Day shift, normally stable hours.
2. Swing shift (about 1600-2400).
3. Mid shift (about 2400-0800).
4. Rotating shift schedule.
5. Day or shift work with irregular/unstable hours.
6. Frequent TDY/travel or frequently on call to report to work.
7. Crew Schedule.

13. How often does your supervisor hold group meetings?

1. Never.	4. Weekly.
2. Occasionally.	5. Daily.
3. Monthly.	6. Continuously.

14. How often are group meetings used to solve problems and establish goals?

1. Never.	3. About half the time.
2. Occasionally.	4. All of the time.

15. What is your aeronautical rating and current status?

1. Nonrated, not on aircrew.
2. Nonrated, now on aircrew.
3. Rated, in crew/operations job.
4. Rated, in support job.

16. Which of the following best describes your career or employment intentions?

1. Planning to retire in the next 12 months.
2. Will continue in/with the Air Force as a career.
3. Will most likely continue in/with the Air Force.
4. May continue in/with the Air Force.
5. Will most likely not make the Air Force a career.
6. Will separate/terminate from the Air Force as soon as possible.

17. To what extent does your job require you to do many different things, using a variety of your talents and skills?

18. To what extent does your job involve doing a whole task or unit of work?

19. To what extent is your job significant in that it affects others in some important way?

20. To what extent does your job provide a great deal of freedom and independence in scheduling your work?

21. To what extent does your job provide a great deal of freedom and independence in selecting your own procedures to accomplish it?

22. To what extent are you able to determine how well you are doing your job without feedback from anyone else?

23. To what extent do additional duties interfere with the performance of your primary job?

24. To what extent do you have adequate tools and equipment to accomplish your job?

25. To what extent is the amount of work space provided adequate?

26. To what extent does your job provide the chance to know for yourself when you do a good job, and to be responsible for your own work?

27. To what extent does doing your job well affect a lot of people?

28. To what extent does your job provide you with a chance to finish completely the piece of work you have begun?

29. To what extent does your job require you to use a number of complex skills?
30. To what extent does your job give you freedom to do your work as you see fit?
31. To what extent are you allowed to make the major decisions required to perform your job well?
32. To what extent are you proud of your job?
33. To what extent do you feel accountable to your supervisor in accomplishing your job?
34. To what extent do you know exactly what is expected of you in performing your job?
35. To what extent are your performance goals difficult to accomplish?
36. To what extent are your job performance goals clear?
37. To what extent are your job performance goals specific?
38. To what extent are your performance goals realistic?
39. To what extent do you perform the same tasks repeatedly within a short period of time?
40. To what extent are you faced with the same type of problem on a weekly basis?
41. To what extent are you aware of promotion/advancement opportunities that affect you?
42. To what extent do co-workers in your work group maintain high standards of performance?
43. To what extent do you have the opportunity to progress up your career ladder?
44. To what extent are you being prepared to accept increased responsibility?
45. To what extent do people who perform well receive recognition?
46. To what extent does your work give you a feeling of pride?

47. To what extent do you have the opportunity to learn skills which will improve your promotion potential?
48. To what extent do you have the necessary supplies to accomplish your job.
49. To what extent do details (tasks not covered by primary or additional duty descriptions) interfere with the performance of your primary job?
50. To what extent does a bottleneck in your organization seriously affect the flow of work either to or from your group.

(In my job, I would like to have the characteristics described --- from "not at all to extremely large amount")
51. Opportunities to have independence in my work.
52. A job that is meaningful.
53. The opportunity for personal growth in my job.
54. Opportunities in my work to use my skills.
55. Opportunities to perform a variety of tasks.
56. A job in which tasks are repetitive.
57. A job in which tasks are relatively easy to accomplish.
58. My supervisor is a good planner.
59. My supervisor sets high performance standards.
60. My supervisor encourages teamwork.
61. My supervisor represents the group at all times.
62. My supervisor establishes good work procedures.
63. My supervisor has made his responsibilities clear to the group.
64. My supervisor fully explains procedures to each group member.
65. My supervisor performs well under pressure.

66. My supervisor takes time to help when needed.
67. My supervisor asks members for their ideas on task improvements.
68. My supervisor explains how my job contributes to the overall mission.
69. My supervisor helps me set specific goals.
70. My supervisor lets me know when I am doing a good job.
71. My supervisor lets me know when I am doing a poor job.
72. My supervisor always helps me improve my performance.
73. My supervisor insures that I get job related training when needed.
74. My job performance has improved due to feedback received from my supervisor.
75. When I need technical advice, I usually go to my supervisor.
76. My supervisor frequently gives me feedback on how well I am doing my job.
77. The quantity of output of your work group is very high.
78. The quality of output of your work group is very high.
79. When high priority work arises, such as short suspensions, crash programs, and schedule changes, the people in my work group do an outstanding job in handling these situations.
80. Your work group always gets maximum output from available resources (e.g., personnel and material).
81. Your work group's performance in comparison to similar work groups is very high.
82. Ideas developed by my work group are readily accepted by management personnel above my supervisor.
83. My organization provides all the necessary information for me to do my job effectively.
84. My organization provides adequate information to my work group.

85. My work group is usually aware of important events and situations.
86. My complaints are aired satisfactorily.
87. My organization is very interested in the attitudes of the group members toward their jobs.
88. My organization has a very strong interest in the welfare of its people.
89. I am very proud to work for this organization.
90. I feel responsible to my organization in accomplishing its mission.
91. The information in my organization is widely shared so that those needing it have it available.
92. Personnel in my unit are recognized for outstanding performance.
93. I am usually given the opportunity to show or demonstrate my work to others.
94. There is a high spirit of teamwork among my co-workers.
95. There is outstanding cooperation between work groups of my organization.
96. My organization has clear-cut goals.
97. I feel motivated to contribute my best efforts to the mission of my organization.
98. My organization rewards individuals based on performance.
99. The goals of my organization are reasonable.
100. My organization provides accurate information to my work group.
101. Feeling of Helpfulness
The chance to help people and improve their welfare through the performance of my job. The importance of my job performance to the welfare of others.

102. Co-Worker relationships
My amount of effort compared to the effort of my co-workers, the extent to which my co-workers share the load, and the spirit of teamwork which exists among my co-workers.
103. Family attitude toward my job
The recognition and the pride my family has in the work I do.
104. On-The-Job Training (OJT)
The OJT instructional methods and instructors' competence.
105. Technical Training (Other than OJT)
The technical training I have received to perform my current job.
106. Work Schedule
My work schedule; flexibility and regularity of my work schedule; the number of hours I work per week.
107. Job Security
108. Acquired Valuable Skills
The chance to acquire valuable skills in my job which prepare me for future opportunities.
109. My Job as a Whole

APPENDIX B
SUPPLEMENTAL QUESTIONNAIRE

PRIVACY ACT STATEMENT

In accordance with paragraph 30, AFR 12-35, The Air Force Privacy Act Program, the following information about this survey is provided.

a. Authority: TO U.S.C., 8012, Secretary of the Air Force: Powers, and Duties, Delegation by Compensation L.O. 9397, 22 Nov 43, Numbering System for Federal Accounts Relating to Individual Persons.

b. Principal Purpose. The survey is being conducted to assess your organization and for Air Force research and development purposes.

c. Routine Uses: Information provided by respondents will be treated confidentially. The averaged data will be used for organizational strength and weakness identification and Air Force-wide research and development purposes.

d. Participation. Response to this survey is voluntary. Your cooperation in this effort is appreciated.

COMPREHENSIVE JOB INVENTORY

The Comprehensive Job Inventory (CJI) is a series of surveys for giving a more thorough description of Air Force organizational and job factors than is provided by most surveys. In order to get this more detailed job description, a more thorough list of items describing job and organizational factors is required. Your job, your work group, and your organization are very important in providing an effective and efficient Air Force; therefore, there are also survey items which deal with these topics. Below is a list of key words that are used in the survey.

Supervisor: The person to whom you report directly.

Work Group: All persons who report to the same supervisor.

Organization: Your Squadron. However, for those individuals who work in staff/support agencies, the division or directorate would be your organization.

With the exception of the Background Information Section, all surveys will have either a (1 - 7) scale or a (0 - 7) scale. In the inventories which include a zero point, the zero should be marked if an item is non-applicable. Mark your answers on the separate answer sheet provided. Please use a number two pencil only. Make heavy black marks that fill the oval-shaped space. For example, using the scale below, if you moderately agree with item statement one, then you would blacken oval number six on the answer sheet as shown in the following example.

Scale:

0 = Not applicable	4 = Neither agree nor disagree
1 = Strongly disagree	5 = Slightly agree
2 = Moderately disagree	6 = Moderately agree
3 = Slightly disagree	7 = Strongly agree

Item Statement

1. The information your work group receives from other work groups is helpful.

Answer Response:

NA

1. (0) (1) (2) (3) (4) (5) (6) (7)

Should the above statement not be applicable for you, then you would mark the unnumbered oval as shown below.

Answer Response:

NA

2. (0) (1) (2) (3) (4) (5) (6) (7)

It is important that you answer all items honestly. Only in this way can an accurate description of your supervisor and your organization be obtained.

Your completed answer sheet will be processed by automated equipment which will summarize the responses in statistical form. Your individual responses will remain confidential, as they will be combined with the responses of many other people.

1. This statement is used to identify which additional survey you are taking. Mark statement 1 as follows.

NA
1. (0) (1) (2) (3) (4) (5) (6) (7)

JOB INVENTORY

Instructions

Below are items which relate to your job. Read each statement carefully and then decide to what extent the statement is true of your job. Indicate the extent that the statement is true of your job by choosing the statement below which best represents your job.

1 = Not at all	5 = To a fairly large
2 = To a very little extent	extent
3 = To a little extent	6 = To a great extent
4 = To a moderate extent	7 = To a very great
	extent

2. To what extent are staff assistance visits helpful in achieving job performance?
3. To what extent do you use management information systems (e.g., reports, computer printouts, etc.) to make decisions in your job?
4. How much of your time is used for planning more than six months ahead?
5. How much of your time is used for weekly or monthly planning?
6. How much of your time is used for daily planning?
7. To what extent are tasks you perform easy to accomplish?
8. To what extent is planning modified to meet changing job related needs?
9. To what extent is planning modified to meet changing environment needs?
10. To what extent does your job keep you busy?

11. To what extent is the amount of information you get from other work groups adequate to meet your job needs?
12. To what extent do you know the objectives of your organization?
13. To what extent is your work group (people under the same immediate supervisor as you) involved in establishing goals?
14. To what extent does your work group solve problems effectively?
15. To what extent does your work group perform effectively under pressure?
16. To what extent do you feel adequately trained to perform your assigned tasks?
17. To what extent are you satisfied with your job?
18. To what extent is the condition of tools or equipment that you use adequate?
19. To what extent are equipment malfunctions handled promptly?
20. To what extent is the lighting in your immediate work area adequate?
21. To what extent is the normal temperature of your work environment comfortable?
22. To what extent are you faced with the same kinds of problems on a daily basis?
23. To what extent is it difficult for you to complete tasks assigned to you on schedule?
24. To what extent does your job require you to adjust your work plans in order to accomplish a task?
25. To what extent does your job require you to juggle your priorities to get work done?
26. To what extent does your job require you to work directly with other work group members to accomplish a task?

27. To what extent does your job require coordination with other work group members to accomplish a task?
28. To what extent does not getting your job done on schedule affect others?
29. To what extent does your job call for you to use your initiative?
30. To what extent is your job interesting?
31. To what extent does your job utilize your training for that job?
32. To what extent does your job enable you to utilize your natural talents or abilities?
33. To what extent does your job provide you the opportunity to accomplish something worthwhile?
34. To what extent does your job provide you the opportunity to use your own judgment?
35. To what extent are there interruptions in your daily routine?
36. To what extent does your job enable you to develop work methods relating to that job?
37. To what extent do discussions with other work group members aid you in performance of your job?
38. To what extent are your work activities organized in a logical, sensible way?
39. To what extent does your job contribute to the goals of your organization?
40. To what extent is your job challenging?
41. To what extent does doing your job well lead to positive feelings from members of your work group?
42. To what extent is your work load adequately considered when job assignments are made?
43. To what extent does trying hard make a difference in doing your job well?

44. To what extent are there times when you receive differing task accomplishment directions from different people in your job?
45. To what extent are you allowed to provide ideas for solving job related problems?
46. To what extent is dealing with people a part of your job?

JOB SATISFACTION QUESTIONNAIRE

Instructions

The items below relate to your job or the Air Force as a profession. Indicate how satisfied or dissatisfied you are with each item. Choose the statement below which best describes your degree of satisfaction or dissatisfaction.

0 = Not applicable	4 = Neither satisfied
1 = Extremely dissatisfied	nor dissatisfied
2 = Moderately dissatisfied	5 = Slightly satisfied
3 = Slightly dissatisfied	6 = Moderately satisfied
	7 = Extremely satisfied

47. Moral Acceptability of Job

The chance to do things not violating your sense of "right or wrong."

48. Self-Improvement Opportunities

The educational and recreational opportunities provided in the surrounding community, and the opportunity provided by the Air Force for self-improvement education.

49. Verbal and Written Communication

The amount of required telephone communication and required paper-work in your job.

ORGANIZATION CLIMATE INVENTORY

Instructions

Below are items which describe characteristics of your organization. Indicate your agreement by choosing the statement below which best represents your opinion concerning your organization.

1 = Strongly disagree	5 = Slightly agree
2 = Moderately disagree	6 = Moderately agree
3 = Slightly disagree	7 = Strongly agree
4 = Neither agree nor disagree	

Select the corresponding number and enter it on the separate answer sheet.

50. The people affected by decisions are asked for their ideas before the decisions are made.

APPENDIX C
COMPREHENSIVE JOB INVENTORY

PRIVACY ACT STATEMENT

In accordance with paragraph 30, AFR 12-35, the Air Force Privacy Act Program, the following information about this survey is provided.

a. Authority: 10 U.S.C., 8012, Secretary of the Air Force: Powers, and Duties, Delegation by Compensation E. O. 9397, 22 Nov 43, Numbering System for Federal Accounts Relating to Individual Persons.

b. Principal Purpose: The survey is being conducted to assess your organization and for Air Force research and development purposes.

c. Routine Uses: Information provided by respondents will be treated confidentially. The averaged data will be used for organizational strength and weakness identification and Air Force-wide research and development purposes.

d. Participation: Response to this survey is voluntary. Your cooperation in this effort is appreciated.

COMPREHENSIVE JOB INVENTORY

The Comprehensive Job Inventory (CJI) is a series of surveys for giving a more thorough description of Air Force organizational and job factors than is provided by most surveys. In order to get this more detailed job description, a more thorough list of items describing job and organizational factors is required. Your job, your work group, and your organization are very important in providing an effective and efficient Air Force; therefore, there are also survey items which deal with these topics. Below is a list of key words that are used in the survey.

Supervisor: The person to whom you report directly.

Work Group: All persons who report to the same supervisor.

Organization: Your Squadron. However, for those individuals who work in staff/support agencies, the division or directorate would be your organization.

With the exception of the Background Information Section, all surveys will have either a seven point (1 - 7) scale or a (0 - 7) scale. The inventories which include a zero point (0 - 7) should be marked if an item is nonapplicable. Mark your answers on the separate answer sheet provided. Please use a number two pencil only. Make heavy

black marks that fill the oval-shaped space. For example, using the scale below, if you moderately agree with item statement one then you would blacken oval number six on the answer sheet as shown in the following example.

Scale:

0 = Not applicable	4 = Neither agree nor disagree
1 = Strongly disagree	5 = Slightly agree
2 = Moderately disagree	6 = Moderately agree
3 = Slightly disagree	7 = Strongly agree

Item Statement

1. The information your work group receives from other work groups is helpful.

Answer Response:

NA

1. (0) (1) (2) (3) (4) (5) (6) (7)

Should the above statement not be applicable for you then you would mark the unnumbered oval as shown below.

Answer Response:

NA

2. (0) (1) (2) (3) (4) (5) (6) (7)

It is important that you answer all items honestly. Only in this way can an accurate description of your job and your organization be obtained.

Your completed answer sheet will be processed by automated equipment which will summarize the responses in statistical form. Your individual responses will remain

confidential, as it will be combined with the responses of
many other persons.

BACKGROUND INFORMATION

This section of the survey concerns your background. The information requested is to insure that the groups you belong to are accurately represented and not to identify you as the individual. Individual responses will be averaged for your total organization in Air Force subgroup and used for both organizational feedback and Air Force-wide studies. Please use the separate answer sheet and darken the oval which corresponds to your response to each question.

1. You are (an/a):

1. Officer	4. Wage Employee Civilian
2. Enlisted	5. Non-Appropriated Fund (NAF)
3. GS Civilian	Employee
	6. Other

2. Your Ethnic Group is:

1. American Indian or Alaskan Native
2. Asian or Pacific Islander
3. Black, not of Hispanic Origin
4. Hispanic
5. White, not of Hispanic Origin
6. Other

3. How often are group meetings used to solve problems and establish goals?

1. Never
2. Occasionally
3. About half the time
4. All of the time

4. What is your aeronautical rating and current status?

1. Nonrated, not on aircrew
2. Nonrated, now on aircrew
3. Rated, in crew/operations job
4. Rated, in support job

5. Which of the following best describes your career or employment intentions?

1. Planning to retire in the next 12 months
2. Will continue in/with the Air Force as a career
3. Will most likely continue in/with the Air Force
4. May continue in/with the Air Force
5. Will most likely not make the Air Force a career
6. Will separate/terminate from the Air Force as soon as possible

JOB INVENTORY

Instructions

Below are items which relate to your job. Read each statement carefully and then decide to what extent the statement is true of your job. Indicate the extent that the statement is true of your job by choosing the statement below which best represents your job.

1 = Not at all	5 = To a fairly large
2 = To a very little extent	extent
3 = To a little extent	6 = To a great extent
4 = To a moderate extent	7 = To a very great extent

6. To what extent does your job require you to do many different things?
7. To what extent does your job require you to use a variety of your talents and skills?
8. To what extent does your job involve doing a whole task or unit of work?
9. To what extent is your job significant in that it affects others in some important way?
10. To what extent does your job provide a great deal of freedom and independence in scheduling your own work?
11. To what extent does your job provide you a great deal of freedom and independence in selecting your own procedures to accomplish it?
12. To what extent does just doing your job provide you with chances to find out how well you are doing your job?
13. To what extent do additional duties (duties not directly related to primary job duties) interfere with the performance of your primary job?
14. To what extent do you have adequate tools and equipment to accomplish your job?
15. To what extent is the amount of work space provided adequate?
16. To what extent does your job provide the chance to know for yourself when you do a good job?

17. To what extent does your job provide the chance to be responsible for your own work?
18. To what extent does doing your job well affect a lot of people?
19. To what extent does your job provide you with the chance to finish completely the piece of work you have begun?
20. To what extent does your job require you to use a number of complex skills?
21. To what extent are you allowed to make major decisions required to perform your job well?
22. To what extent are you proud of your job?
23. To what extent do you feel accountable to your supervisor in accomplishing your job?
24. To what extent do you know exactly what is expected of you in performing your job?
25. To what extent are your job performance goals difficult to accomplish?
26. To what extent are staff assistance visits helpful in achieving job performance?
27. To what extent are your job performance goals as set by others or the organization clear and specific?
28. To what extent are your job performance goals as set by others or the organization realistic?
29. To what extent do you use management information systems (e.g., reports, computer printouts, etc.) to make decisions in your job?
30. How much of your time is used for planning more than six months ahead?
31. How much of your time is used for weekly or monthly planning?
32. How much of your time is used for daily planning?
33. To what extent do you perform the same tasks repeatedly within a short period of time?

34. To what extent are you faced with the same type of problem on a weekly basis?
35. To what extent are tasks you perform easy to accomplish?
36. To what extent is planning modified to meet changing job-related needs?
37. To what extent is planning modified to meet changing environment needs?
38. To what extent is the amount of information you get from other work groups adequate to meet your job needs?
39. To what extent do you know the objectives of your organization?
40. To what extent are you aware of promotion/advancement opportunities that affect you?
41. To what extent is your work group (people under the same immediate supervisor as you) involved in establishing goals?
42. To what extent do you have the opportunity to progress up your career ladder?
43. To what extent are you being prepared to accept increased responsibility?
44. To what extent do people who perform well receive recognition?
45. To what extent do you feel adequately trained to perform your assigned tasks?
46. To what extent are you satisfied with your job?
47. To what extent does your work give you pride and feeling of self-worth?
48. To what extent is the condition of tools or equipment that you use adequate?
49. To what extent are equipment malfunctions handled promptly?
50. To what extent are necessary materials or supplies available?

51. To what extent is the lighting in your immediate work area adequate?
52. To what extent is the normal temperature of your work environment comfortable?
53. To what extent do you have the opportunity to learn skills which will enhance your promotion potential?
54. To what extent are you faced with the same kinds of problems on a daily basis?
55. To what extent is it difficult for you to complete tasks assigned to you on schedule?
56. To what extent does your job require you to adjust your work plans in order to accomplish a task?
57. To what extent does your job require you to juggle your priorities to get work done?
58. To what extent does your job require you to work directly with other work group members to accomplish a task?
59. To what extent does your job require coordination with other work group members to accomplish a task?
60. To what extent does not getting your job done on schedule affect others?
61. To what extent does your job call for you to use your initiative?
62. To what extent is your job interesting?
63. To what extent does your job utilize your training for that job?
64. To what extent does your job enable you to utilize your natural talents or abilities?
65. To what extent does your job provide you the opportunity to accomplish something worthwhile?
66. To what extent does your job keep you busy?
67. To what extent does your job provide you the opportunity to use your own judgment?

68. To what extent are there interruptions in your daily routine?
69. To what extent does your job enable you to develop work methods relating to that job?
70. To what extent are you allowed to do your work the way you feel is best?
71. To what extent do discussions with other work group members aid you in performance of your job?
72. To what extent are your work activities organized in a logical sensible way?
73. To what extent does your job contribute to the goals of your organization?
74. To what extent is your job challenging?
75. To what extent does your job enable you to learn new things?
76. To what extent does doing your job well lead to positive feelings from members of your work group?
77. To what extent does doing your job well lead to rewards from the organization?
78. To what extent is your work load adequately considered when job assignments are made?
79. To what extent does trying hard make a difference in doing your job well?
80. To what extent are there times when you receive differing task accomplishment directions from different people in your job?
81. To what extent are you allowed to provide ideas for solving job-related problems?
82. To what extent is dealing with people a part of your job?

JOB SATISFACTION QUESTIONNAIRE

Instructions

The items below relate to your job or the Air Force as a profession. Indicate how satisfied or dissatisfied you are with each item. Choose the statement below which best describes your degree of satisfaction or dissatisfaction.

0 = Not applicable	4 = Neither satisfied nor dissatisfied
1 = Extremely dissatisfied	
2 = Moderately dissatisfied	5 = Slightly satisfied
3 = Slightly dissatisfied	6 = Moderately satisfied
	7 = Extremely satisfied

83. Feeling of Helpfulness

The chance to help people and improve their welfare through the performance of your job. The importance of your job performance to the welfare of others.

84. Family Attitude Toward Job

The recognition and the pride your family has in the work you do.

85. Moral Acceptability of Job

The chance to do things not violating your sense of "right or wrong."

86. Self-Improvement Opportunities

The educational and recreational opportunities provided in the surrounding community, and the opportunity provided by the Air Force for self-improvement education.

87. Verbal and Written Communication

The amount of required telephone communication and required paperwork in your job.

88. Work Itself

The challenge, interest, importance, variety, and feelings of accomplishment you receive from your work.

89. Work Schedule

Your work schedule, flexibility and regularity of your work schedule, the number of hours you work per week.

90. Job Security

91. Acquired Valuable Skills

The chance to acquire valuable skills in your job
which prepare you for future opportunities.

92. Your Job as a Whole

ORGANIZATION CLIMATE INVENTORY

Instructions

Below are items which describe characteristics of your organization. Indicate your agreement by choosing the statement below which best represents your opinion concerning your organization.

1 = Strongly disagree	5 = Slightly agree
2 = Moderately disagree	6 = Moderately agree
3 = Slightly disagree	7 = Strongly agree
4 = Neither agree nor disagree	

Select the corresponding number and enter it on the separate answer sheet.

93. Your organization is very interested in the attitudes of the group members toward their jobs.
94. Your organization has a very strong interest in the welfare of its people.
95. I am very proud to work for this organization.
96. I feel responsible to my organization in accomplishing its mission.
97. The people affected by decisions are asked for their ideas before the decisions are made.
98. Personnel in my unit are recognized for outstanding performance.
99. I am usually given the opportunity to present the results of my work to others.
100. There is a high spirit of teamwork that exists between co-workers.
101. I feel motivated to contribute my best efforts to the mission of this organization.
102. This organization rewards individuals based on performance.

PERCEIVED PRODUCTIVITY

Instructions

The statements below deal with the output of your work group. For some jobs certain statements may not be applicable. Should this be the case for your work group, then you should select the not applicable statement coded "0" below. Indicate your agreement with the statement by selecting the answer which best represents your attitude concerning your work group.

0 = Not applicable	4 = Neither agree nor disagree
1 = Strongly disagree	5 = Slightly agree
2 = Moderately disagree	6 = Moderately agree
3 = Slightly disagree	7 = Strongly agree

103. The quantity of output of your work group is very high.
104. The quality of output of your work group is very high.
105. When high priority work arises, such as short suspenses, crash programs, and schedule changes, the people in my work group do an outstanding job in handling these situations.
106. Your work group always gets maximum output from available resources (e.g., personnel and material).
107. Your work group's performance in comparison to similar work groups is very high.
108. Your work group solves problems very effectively.
109. Your work group maintains high standards of performance.
110. Your work group performs effectively under pressure.

THANK YOU FOR YOUR COOPERATION

COMPREHENSIVE JOB INVENTORY

(Factor List)

<u>Factor</u>	<u>Title</u>	<u>Item</u>
1	Job Enrichment	6, 7, 8, 9, 16, 17, 18, 20, 22, 24, 46, 47, 60, 61
2	Task Autonomy	10, 11, 12, 19, 21
3	Planning & Time Management	26, 28, 29, 30, 31, 32, 36, 37, 38, 41
4	*(See Factor 10)	
5	Advancement/Recognition	39, 40, 42, 43, 44
6	Equipment/Work Space/ Goal Clarity	14, 15, 27, 28, 48, 49, 50
7	Work Repetition	33, 34
8	Task Accomplishment	13, 25, 35
U _o	Unique	45, 51-59, 62-82

*PERCEIVED PRODUCTIVITY INVENTORY

(New Hypothetical Factor)

9	Perceived Productivity	103-106
10	Work Group Performance	107-110

APPENDIX D
FACTOR LOADINGS

FACTOR	ITEM	LOADING	QUESTION/STATEMENT
Factor 1	12	.54	To what extent do you know the objectives of your organization?
Job Enrichment	17	.83	To what extent are you satisfied with your job?
	29	.69	To what extent does your job call for you to use your initiative?
	30	.84	To what extent is your job interesting?
	31	.77	To what extent does your job utilize your training for that job?
	32	.86	To what extent does your job enable you to utilize your natural talents?
	33	.88	To what extent does your job provide you with the opportunity to accomplish something worthwhile?
	34	.76	To what extent does your job provide you with the opportunity to use your own judgement?
	38	.52	To what extent are your work activities organized in a logical, sensible way?
	39	.69	To what extent does your job contribute to the goals of your organization?
	40	.85	To what extent is your job challenging?

FACTOR	ITEM	LOADING	QUESTION/STATEMENT
Factor II Task Significance	41	.66	To what extent does doing your job well lead to positive feelings from members of your work group?
	45	.70	To what extent are you allowed to provide ideas for solving job related problems?
	67	.62	To what extent does your job require you to do many different things, using a variety of your talents and skills?
	68	.64	To what extent does your job involve doing a whole task or unit of work?
	69	.61	To what extent is your job significant, in that it affects others in some important way?
Factor III Task Autonomy	79	.57	To what extent does your job require you to use a number of complex skills?
	82	.71	To what extent are you proud of your job?
	95	.68	To what extent does your work give you a feeling of pride?
	70	.64	To what extent does your job provide a great deal of freedom and independence in the scheduling of your work?
	71	.75	To what extent does your job provide a great deal of freedom and independence in selecting your own procedures to accomplish it?

FACTOR	ITEM	LOADING	QUESTION/STATEMENT
	72	.60	To what extent are you able to determine how well you are doing your job without feedback from anyone else?
	76	.54	To what extent does your job provide the chance to know for yourself when you do a good job, and to be responsible for your own work?
	80	.70	To what extent does your job give you freedom to do your work as you see fit?
	81	.68	To what extent are you allowed to make the major decisions required to perform your job well?
Factor IV	23	.65	To what extent is it difficult for you to complete tasks assigned to you on schedule?
Time Management	24	.78	To what extent does your job require you to adjust your work plans in order to accomplish a task?
	25	.77	To what extent does your job require you to juggle your priorities to get work done?
	35	.66	To what extent does your job provide you with the opportunity to use your own judgement?

FACTOR	ITEM	LOADING	QUESTION/STATEMENT
Factor V	101	.73	Opportunities to have independence in my work.
Need of Achievement	102	.87	A job that is meaningful.
Job Desires	103	.87	The opportunity for personal growth in my job.
	104	.87	Opportunities in my work to use my skills.
	105	.73	Opportunities to perform a variety of tasks.
Factor VI	3	.60	To what extent do you use management information systems (e.g., reports, computer printouts, etc.) to make decisions in your job?
Planning	4	.66	How much of your time is used for planning more than six months ahead?
	5	.71	How much of your time is used for weekly or monthly planning?
	6	.65	How much of your time is used for daily planning?
Factor VII	47	.85	Moral Acceptability of Job
Work Climate Values			The chance to do things not violating your sense of "right or wrong"

FACTOR	ITEM	LOADING	QUESTION/STATEMENT
	48	.89	Self-Improvement Opportunities The educational and recreational opportunities provided in the surrounding community, and the opportunity provided by the Air Force for self-improvement.
	49	.84	Verbal and Written Communication The amount of required telephone communication and required paper-work in your job.
	50	.77	The people affected by decisions are asked for their ideas before the decisions are made.
	93	.71	To what extent do you have the opportunity to progress up your career ladder?
81	94	.58	To what extent are you being prepared to accept increased responsibility?
Factor VII	97	.69	To what extent do you have the opportunity to learn skills which will improve your promotion potential?
Factor IX	18	.61	To what extent is the condition of tools or equipment that you use adequate?
Work Support	19	.53	To what extent are equipment malfunctions handled promptly?

FACTOR	ITEM	LOADING	QUESTION/STATEMENT
Factor X	74	.74	To what extent do you have adequate tools and equipment to accomplish your job?
Equipment Goal Clarity	98	.76	To what extent are your performance goals realistic?
Factor XI	73	.75	To what extent do <u>additional duties interfere with the performance of your primary job?</u>
Work Interferences	99	.76	To what extent do details (tasks not covered by primary or additional duty descriptions) interfere with the performance of your primary job?
82 Factor XII	89	.72	To what extent do you perform the same tasks repeatedly within a short period of time?
Work Repetition	90	.67	To what extent are you faced with the same type of problem on a weekly basis?
Factor XIII	14	.66	To what extent does your work group solve problems effectively?
Work Group Performance	15	.62	To what extent does your work group perform effectively under pressure?
Factor XIV	106	.67	A job in which tasks are repetitive.
Desired Repetitive Tasks	107	.70	A job in which tasks are relatively easy to accomplish.

TABLE 4
JOB SATISFACTION

STEP	VARIABLE ENTERED REMOVED	F TO ENTER OR REMOVE	SIGNIFICANCE	MULTIPLE R	R SQUARE	R SQUARE CHANGE
1	F3	1063.12298	.000	.87357	.76312	.87357
2	F14	518.34974	0	.95290	.90803	-.38066
3	F5	51.70005	.000	.95945	.92055	.01252
4	F2	38.83468	0	.95384	.92898	.00843
5	F7	11.57418	.001	.95510	.93142	.00243
6	F11	9.43581	.002	.96610	.93335	.00193
7	F6	6.70259	.010	.96680	.93470	.00135
8	F1	3.68062	.056	.96718	.93544	.00074
9	F10	3.17251	.076	.96751	.93607	-.02712
10	F12	3.14800	.077	.96783	.93669	.00063
11	F8	2.23521	.136	.96806	.93713	-.02492
12	F9	1.70801	.192	.96823	.93747	.00044
13	F13	.76158	.383	.96831	.93761	.02096
14	F4	.05969	.807	.96831	.93763	-.01222
						-.00343

AD-A105 055

AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OH SCHOOL--ETC F/G 5/1
JOB CHARACTERISTICS VARIABLES: THE RELATIONSHIP OF JOB VARIABLE--ETC(U)
JUN 81 L H CHALK, F D NIELSEN

UNCLASSIFIED

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TABLE 5

ORGANIZATIONAL CLIMATE

STEP	VARIABLE ENTERED REMOVED	F TO ENTER OR REMOVE	SIGNIFICANCE	MULTIPLE R	R SQUARE	SIMPLE R CHANGE
1	F8	123.47575	.000	.52181	.27229	.52181
2	F5	154.76390	0	.71070	.50509	.48250
3	F2	217.06602	0	.83796	.70218	.44395
4	F9	88.76239	0	.87508	.76577	.25215
5	F13	76.54367	.000	.90017	.81031	-.21104
6	F3	17.16700	.000	.90544	.81982	.09752
7	F14	8.78142	.003	.90806	.82458	.00475
8	F10	6.32536	.012	.90992	.82795	.06895
9	F6	5.38830	.021	.91147	.83078	.05805
10	F11	5.33988	.021	.91299	.83355	.00277
11	F1	2.59522	.108	.91372	.83489	.00134
12	F7	2.27909	.132	.91436	.83606	.03659
13	F4	2.16501	.142	.91497	.83717	.03422
14	F12	.67822	.411	.91516	.83751	.00035

TABLE 6
PERCEIVED PRODUCTIVITY

STEP	VARIABLE ENTERED	VARIABLE REMOVED	F TO ENTER OR REMOVE	SIGNIFICANCE	MULTIPLE R	R SQUARE	R SQUARE CHANGE	SIMPLE R
1	F2		373.88884	0	.72882	.52118	.52118	.72882
2	F5		282.80589	0	.86481	.74789	.21671	.46552
3	F8		60.70492	.000	.88728	.78726	.03937	.19843
4	F9		37.10829	0	.89941	.80894	.02168	.14725
5	F3		11.15858	.001	.90292	.81527	.00632	.07952
6	F14		7.87463	.005	.90534	.81964	.00437	-.06611
7	F7		7.57818	.006	.90761	.82376	.00412	.06420
8	F11		7.63736	.006	.90985	.82783	.00407	-.06380
9	F6		4.32099	.038	.91110	.83011	.00228	.04775
10	F10		2.26685	.133	.91176	.83130	.00119	.03452
11	F13		2.24306	.135	.91240	.83247	.00117	-.03427
12	F12		1.44349	.230	.91281	.83323	.00075	.02747
13			.68229	.409	.91301	.83359	.00036	.01890

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